A new restaurant in Palma

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Content

1. Introduction

Palma is a small city in Spain that has a high level of tourism all the year. People from England, Germany and a lot of other countries can be easily seen walking around the city, eating in their restaurants or swimming at the wonderful beach it has. They are not the only people in the city, around 400.000 people live there and they usually like to go out to the different restaurants that Palma provides to them

Figure 1 Map of Palma

The quantity and variety of restaurants that can be seen grows every year. Moreover, the quantity of money that was spent in restaurants has been going up in the past years.

We can separate the city in 3 parts for this project: the old part which would be separated by the rest with an orange line, the nearest part to the center which is between the old part and the "Via Cintura" (which will be drawn with a red line) and the rest which is the part outside the line of the "Via Cintura".

2. Problem to solve

Looking at this situation, a gastronomic company "Comer Bien" has contacted us to make an analysis of the actual state of the city to obtain information related with the restaurants of the center of Palma and what kind of business would be around them.

With all this information, "Comer Bien" could decide the location of some new restaurants that the want to open and in which type of food they should focus depending on the places around them.

3. Data used

For this project there are different types of information that we need:

3.1. **City**

To provide a better cut of the city we will use the neighborhoods of the city provided by the Wikipedia page and Geo-Hack to obtain the coordinates of them.

https://es.wikipedia.org/wiki/Anexo:Barrios_de_Palma_de_Mallorca

3.2. **Restaurants**:

To get info of the different restaurants of the neighborhoods and which type of food they provide we will use Foursquare (one of the tools that we have been using in this course).

3.3. Other important places of the city:

This info will also been provided by the Foursquare system. This info contains hotels, museum, open markets and other type of places that could affect the income of the restaurant.

3.4. **Socio economical info about the city:**

To get a better vision of the state of the different parts of the city we will take in consideration info like: high criminality neighborhoods, average neighborhood income and popular places at this date.

Source:

https://www.palma.cat/portal/PALMA/contenedor1.jsp?seccion=s_fnot_d4_v1.jsp&contenido=64129&tipo=8&nivel=1400&layout=contenedor1.jsp&codResi=1&language=es

http://habitat.aq.upm.es/bbvv/fichas/2006/mapas-ciudad/mapa06_07040.jpg

https://www.ultimahora.es/noticias/local/2019/01/17/1051505/cual-barrio-mas-rico-palma.html

4. Data acquisition and cleaning

4.1. Neighborhoods

The first data that we had to obtain was the different neighborhoods that Palma had and where they were located. This helps to divide the city in fixed parts being easier all the next steps that where needed.

The information was obtained from the Wikipedia page and confirmed by the main hall web page obtaining this list:

Sa Calatrava	Pedro Garau	La Indiotería (rural)	La Bonanova	Son Vida
Cort	Polígono de Levante	La Indiotería (urbano)	Cala Mayor	Son Xigala
Jaime III	Rafal Nou	L'Oliverar	Camp d'en Serralta	Son Ximelis
Sa Teulera y Bellver	Rafal Vell	Plaza de Toros	El Fortí	El Terreno
Cort	La Soledad Norte	Secar de la Real	Génova	
La Missió	La Soledad Sur	Son Espanyol	El Jonquet	
Monti-sion	Son Canals	Son Oliva y Son Sardina	Portopí	
Plaça dels Patins	Son Cladera	Aeropuerto	Sant Agustí	
Puig de Sant Pere	Son Fortesa Norte	S'Aranjassa	Santa Catalina	
Sant Jaume	Son Fortesa Sur	Sa Casa Blanca	Son Anglada	
Sant Nicolau	Son Gotleu	Sant Jordi	Son Armadams	
La Seu	Son Malferit	S'Arenal	Son Cotoner	
Sindicat	Son Rullán	Son Ferriol	Son Dameto	
Zona portuaria y Cabrera	El Vivero	Son Riera	Son Dureta	
Can Capes	Amanecer	Can Pastilla	Son Espanyolet	
Estadio Balear	Arxiduc	Can Pere Antoni	Son Flor	
Foners	Bons Aires	El Coll d'en Rabassa	Son Peretó	
Els Hostalets	Camp Redó	Es Pil.larí	Son Rapinya	
Virgen de Lluc	Cas Capiscol	Les Meravelles y El Molinar	Son Roca	
Marqués de la Fontsanta	Establiments	Los Almendros-Son Pacs	Son Serra-La Vileta	

Using Geo-Hack, we could get the latitude and longitude of all the neighborhoods and using python we could visualize all of them in a map. To fit in the client space, we deleted some of them obtaining the final list that will be used in future steps.

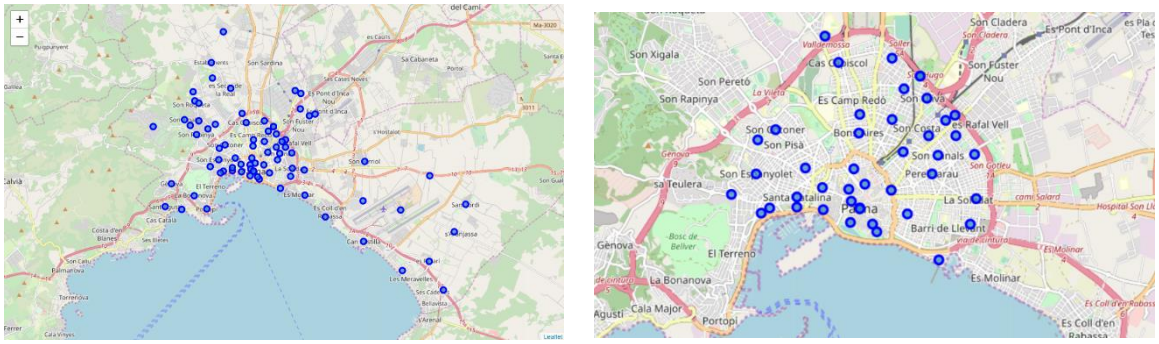

Figure 2 Neighborhoods before and after filter

4.2. Places of interest

The next data that we would use was information about places of interest and where are they located. This places could be restaurants, museum or hotels for example but there are much more categories which we could use.

To get this information we used the Foursquare platform and an account created to make the requests needed.

This requests where made using API provided by Foursquare. For it we passed the coordinate of each of the neighborhoods, a radius to delimitate the search and a limit of results (which was much higher than the actual results of each one of the requests).

The results were put in a table so we could see the place, its coordinates, how it was classified and the neighborhood where it was located.

4.3. Restaurants and hotels

A small code was done to obtain only the type of places that we wanted to visualize or to manipulate. To do that, the code looked in the classification of all the places obtained before and if it contained a specific Word, it was marked with a flag and the copied to a new table.

It was developed in the beginning to see the restaurants and hotels but it could be used to any type of place that was in the first list.

4.4. Socio economic data

To make a better analysis we obtained more information about the city to provide a better conclusion. This data was obtained from different sources like newspapers, popular gastronomic blogs or official pages from the government.

The first thing was to see the places with higher criminality of the city or that it was usual to see criminal acts and delete them from the list. We were lucky that any of the lists that were seen contained any of the neighborhoods that we had in our final list.

The next thing was to observe the average neighborhood income obtaining a list that could be useful if there are different places that could behold the restaurant and we had to decide one.

Also the definition of popular places where people usually go has a similar function to the last aspect.

5. Clustering process

5.1. Classification of each neighborhood

The first task was to make a classification of each neighborhood depending on the type and number of places that where there. For this task the main data used was the table obtained in 4.2.

This table was transformed to obtain for each neighborhood which number of places of each category had (Italian restaurant, hotel, café, park, …) and do a mean of them to make it easier for the next steps.

After some experiments it was determined that the best number of clusters was 8 because when the number was lower the classification of each neighborhood was very general and if it was higher a minimal detail could differentiate 2 that were very similar.

The result can be seen in this map:

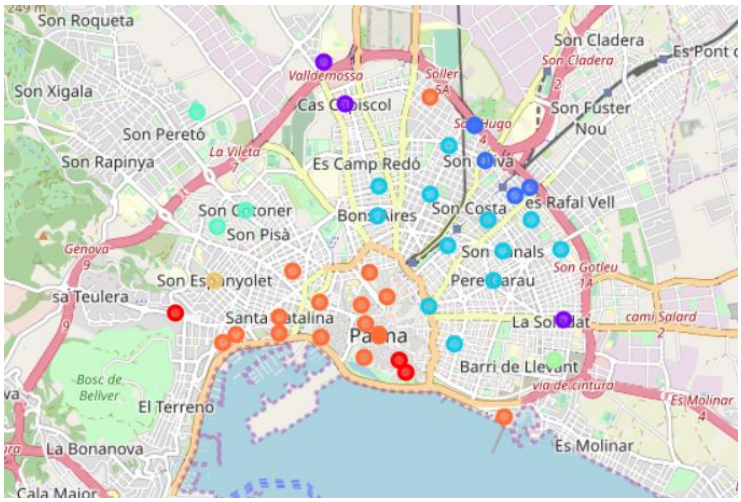

Figure 3 General clustering

5.1.1. Cluster 1 (red)

The first cluster only contains “Son Dureta” which is a neighborhood from a place with big open spaces and most of the places around are big houses so it is normal to have it alone in one cluster. Monti-sion and Calatrava have similar descriptions also

5.1.2. Cluster 2 (light blue)

The second one contains neighborhoods outside the old part of the city containing familiar neighborhoods where we can see supermarkets and cafes.

5.1.3. Cluster 3 (green)

The third one only contains “Polígono de Levante” that is an internal industrial location.

5.1.4. Cluster 4 (dark blue)

The fourth one contains the frontier of our analysis where we can see neighborhoods with parks and small shops.

5.1.5. Cluster 5 (orange)

The fifth one contains most of the neighborhoods of the old part where hotels, museums and a lot of restaurants can be seen.

5.1.6. Cluster 6 and 7 (yellow and turquoise)

This two clusters have very similar places around. They are neighborhoods with a lot of small shops and restaurants, most of them fast food or bars.

5.1.7. Cluster 8 (no color)

The seventh one contains different neighborhoods that are near the main transport stations and we can see a lot of ice cream shops and cafes or places to be in a small time.

5.2. Classification depending of restaurants

Now that we understand this part of the city better we could make a classification of the neighborhoods depending on the main type of restaurants that it has.

The first step is to make a filter to get only the places that contained the word “Restaurant” in its classification.

Then the process is very similar to the one used in 5.1. This time the number of clusters was 5 after different tests. In the process we observed that some of the neighborhoods did not have restaurants in the list so they were deleted from the process.

The result can be seen in the image below:

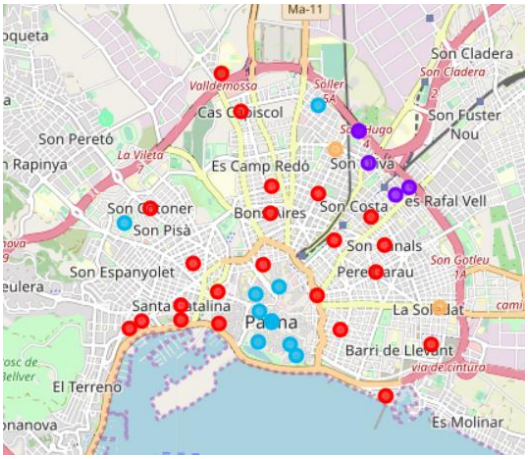

Figure 4 Restaurant clustering

5.2.1. Cluster 1 (red)

The first cluster contains a lot of the neighborhoods around the old part and they have a lot of Spanish, Italian and Mediterranean restaurants.

5.2.2. Cluster 2 (violet)

The second one contains neighborhoods from the limit of the space treated and it contains a as higher number tapas restaurant but in all of them the next nine elements in the top are foreign food like Asian, Argentinian or Brazilian.

5.2.3. Cluster 3 (blue)

The third one contains most of the neighborhoods of the old part and they have a lot of tapas and Spanish restaurants very similar to the first one but it also has a lot of seafood and vegetarian restaurants. We can classify it as a fancy place to eat.

5.2.4. Cluster 4 (orange)

The fourth one contains the frontier of our analysis where we can see neighborhoods with small quantity of restaurants.

5.2.5. Cluster 5 (green)

The fifth one only contains “Son Flor” because the list of most common venues is a mix of everything and it could be difficult to relate with any of the other groups.

6. Other treatments and analysis

6.1. Hotels

Hotels can be a great income of people to our restaurant so it is a good idea to see where are they located and analyze what is around them.

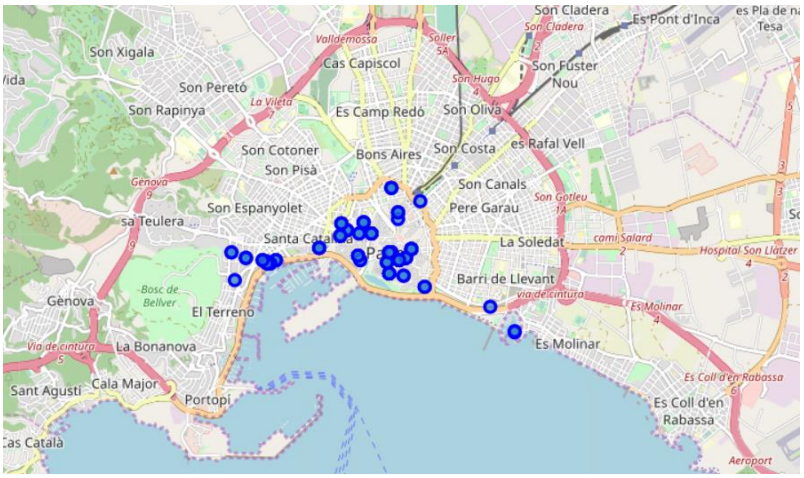

Figure 5 Hotels

The main analysis is to see which hotel is closer to each restaurant and to see that distance to know if that restaurant is, in part focused in attracting people of that hotel.

To do that, we get two tables with the restaurants and the hotels and their info also. Then we take the closest distance between a hotel and each one of the restaurants and then we see which the closest one is.

With the name of the restaurant, their closest hotel and the distance we can see if that distance is close enough to say that it can get a big quantity of the hotel guest as clients.

Having a max distance of 10^-6 units (using the decimal degrees as unit), we can obtain the next map with the restaurants that can obtain clients from very near hotel:

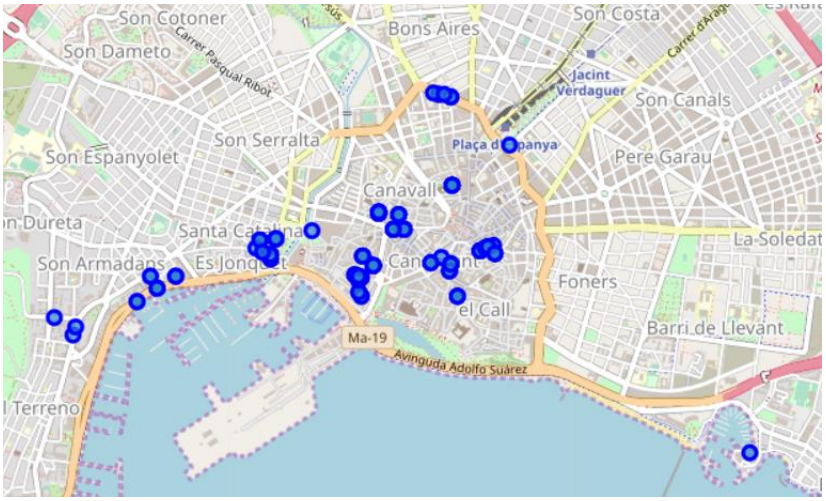

Figure 6 Restaurants close to hotel

7. Results

After looking at all the information that we get we can obtain different information that can help the client to decide where to put a restaurant and which type of restaurant:

If the client is looking for a more familiar restaurant it would be better to place it outside the old part of the city but not very far and in the north-east part. Neighborhoods like “Plaza de Toros” or “Bons Aires”

I would not try to open an restaurant in the limit of our area studied because with the information of the mean income and the results of the analysis we can say that the income will be low and the people near the place will not be interested in a more fancy or expensive type of food. If it is not planned a more strategic move it is not a recommended place.

If the client wants to open a place for Tapas it is recommended to use the nearest part outside the old part of the city. It can be superposed with the part of more familiar type of restaurant.

The part of the coast that it is not inside the old part can be considered for Mediterranean or Italian food. It can also be a good strategy to attract clients from near hotels as some of the ones that we have seen before.

For the center of the city we can see three facts that can be used to define our restaurant. It is very usual to have a hotel near so it can be interesting to have part of our marketing focused in them. The type of food that is usually seen is Mediterranean or seafood (and in a minor way tapas or Spanish food). The mean income in that part of the city is quite high so it can be good to make more fancy food that a traditional one.

One point of consideration is Santa Catalina which is a popular place in all the food blogs and is near the old city and different hotels. Despite the high price of the rent, it can be a good opportunity to open a restaurant that can have a lot of characteristics: hotel focused; tapas, Mediterranean, Italian food; popular place; high mean income.

8. Future steps and aspects to think about

With all this information anyone can get a general view about how restaurants are located around this part of the city, what type of food they sell and a brief knowledge about their clients.

Despite all that, there can be done many other things to obtain information that could be used to make a decision about where and how to create a restaurant. We can say that all this can be grouped in a future steps list:

- Study the relationship between the type of restaurants with the rent price of every neighborhood
- Study the lack of a certain type of restaurant in the different parts looking the mean income of those restaurants
- Look for some empty places and do a k-nearest neighbors analysis to obtain which would be the type of restaurant depending on the nearest ones.

Moreover, the creation of a strategy with other partners or the correlation with events or the construction of places that could attract people can affect any decision.

9. Conclusion

Despite all the above, the results of this projects correlated with the known by the people living in Palma so it can be useful for people that have not been in Palma and want to know more about its gastronomy and which part of the city you can easily eat some kind of food.